Agenda

Hawaii Performance Contracting Workshop 2003

Date: February 26, 2003
Time: 7:30 a.m. to 4:00 p.m.
Location: HEI Training Room - Bishop Square - Pacific Tower
Bishop Street.
Parking: Self-Parking options include Alii Place, First Hawaiian Tower

Title: Hawaii Energy Performance Contracting Workshop - 2003

Sponsored by: The State of Hawaii DBEDT, U.S. Department of Energy, Rebuild America and the Rebuild Hawaii Consortium Members

Objective: This interactive workshop will focus on having an interactive discussion on how to successfully implement the use of Energy Performance contracts to meet financial, environmental and energy security goals of the State of Hawaii.

Participants: Governmental Department Heads, Directors, Fiscal Officers, Contracting Officers
Governmental Facilities Management Personnel
Administration / Legislators
Federal / State and City Energy Agencies
Electric and Gas Utilities
Energy Service Companies

Agenda

7:30 a.m. Networking Breakfast - Bagels & Pastries

8:30 a.m. Opening and Statement of Workshop Goals by Steve Holmes

8:45 a.m. Introductions / Workshop Purpose & Format Discussion - This workshop's goal is to achieve increased use of the Energy Savings Performance Contracting vehicles through greater understanding of what has been accomplished and benefit from the local lessons learned.

9:00 a.m. Field Questions and Outcome goals from participants - To be used by speakers as a guide to address during workshop.

9:15 a.m. National View of ESPC use by State and Local Government Agencies - Jeff Crenshaw,
- What is an ESPC Contract? - History of ESPC - Background on the Development, Components, Process Steps
- National Trends in ESPC use - Key Business Drivers for Government Agencies / LEED Process use
- Innovative use of ESPC contracts - Creative ways State & City agencies use ESPC contracts to perform work

10:00 a.m. Break

Agenda

10:15 a.m. Rebuild Hawaii Member Project Review - Discussion of Project Scope(s) / Project Size(s) / Financing / Status / Benefits Observed / Lesson Learned / Recommended Improvements:

City & County of Honolulu - Allyn Lee
Honolulu Hale - Department of Design and Construction
Traffic Signal Systems - Department of Transportation Services

County of Hawaii - Ray Carr
Hawaii County Buildings –

County of Kauai – Kevin Au
29 Kauai County Buildings Project - Key lessons on contract language and experience with M&V. Water & Wastewater Project Barriers

State of Hawaii -
University of Hawaii at Hilo – Michael Chang
University of Hawaii Community Colleges – Kevin Au
Hawaii Health Systems Corporation – Tracy Taoka
The Judiciary - Ongoing – Michael Chang
Hawaii Army National Guard - Ongoing - Ken Stacy

11:15 a.m. Lunch - Sandwiches Provided

12:00 p.m. Rebuild Hawaii Member Project Review - Discussion of Project Cont.
Federal Government -
Air Force - Hickam AFB – Kevin Au
Army - Tripler AMC – Michael Chang
Navy - Navy Region Southwest – Chris Lippert
Marine Corps - Marine Corps Base Hawaii – Bill Nutting

1:00 p.m. Government & Utility Implementation Assistance Available
DBEDT – Role & Enabling Legislation - Liz Raman
Department of Energy - FEMP Assistance - Eileen Yoshinaka
HECO/MECO/HELCO - Energy Programs - Jim Maskrey

1:50 p.m. Break

2:00 p.m. ESPC Project Component Discussions - Honeywell, Johnson Controls, Noresco
Energy Studies - What is involved.
Project Financing - What is available & how does it work?
Measurement & Verification - Commonly used methods.

3:00 p.m. Roundtable Discussion - Project Reps / ESCOs / Workshop Attendees
Field Questions about projects
Answers / Discussion

4:00 p.m. Adjourn

National View of ESPC Use By State and Local Government

Jeff Crenshaw

Director, Public Sector Markets

Johnson Controls, Inc.

JOHNSON CONTROLS

Environmental Impact of Buildings

Americans spend up to 90% of their time indoors

<u>Buildings:</u>

- **consume 40% of all energy**
- **add 40% to atmospheric emissions**
- **use 60% of all electricity and 25% of all water**
- **take up 35-40% municipal solid waste stream**
- **use of 25-30% of all wood and materials**
- **exploit significant amounts of land**

JOHNSON CONTROLS

Lessening Economic and Environmental Impact

Energy Saving Actions (1990-2000)

- **Energy Cost Savings – $16.7 billion**
- **Electric Energy Savings – 166 million MWh**
- **Electric Demand Reductions – 2,500 MW**
- **Carbon Dioxide Emissions Reduction 217 Million Tons**

JOHNSON CONTROLS

Lessening Economic and Environmental Impact

Total Energy Saving Actions
(1990-2020)

- **$95 billion in energy savings**
- **981 MWh in electric energy savings**
- **6,000 MW in electric demand reduction (15 new 400 MW power plants)**

- **5.3 billion MMBTU reduction in direct fuel use**
- **Total savings power all California households for 13 years, and 4% of of Kyoto Goals**

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Reduced Environmental Impact

Energy saving actions mean reducing:

- **1.21 billion tons of CO_2**
- **4.4 million tons of NO**
- **7.2 million tons of SO_2**
- **34.6 tons of mercury**
- **57.6 tons of cadmium**
- **3.2 tons of lead emissions**
- **129,000 tons of particulates (PM10)**

Equals planting 3.8 billion trees or removing pollution of 250 million mid-sized cars

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Performance Contracting: A Short History

- State regulations separating procurement of financing, equipment and services once made performance contracting impossible
- Ohio House Bill 264
- PC Began primarily in the MUSH markets (municipalities, universities, schools and health care) in late 1970s, early 1980s
- 46 states have legislation or codes and all states permit performance contracting

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Performance Contracting Facts

- $3 billion industry in 2001 in U.S. and Canada
- Was $500 million in 1992 – grown 6 times
- Hundreds of companies but most PCs are handled by less than 100 companies
- Typical PC costs in local government projects range from $700,000 to $1.4 million
- Energy consumption is typically reduced by 26 to 42%
- 50% of all PC projects documented to actually exceed savings

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Key Drivers for Local Government PC

- Support public facilities
  - Fire stations
  - Police stations
  - Libraries
  - Arenas
- Upgrade waste water facilities
- Reduce costs and improve efficiency
- Positive public relations
- Safety / security of employees, visitors and physical assets
- Economic development
- Comply with EPA standards and healthy working environments
- Upgrade aging facilities

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Benefits of Performance Contracting

- Provides better management and control of facility operations and costs
- Increases IEQ, reduces risk exposure and increases employee productivity
- Diverts utility cost to pay for needed capital facility improvements
- Preserves limited capital dollars
- Reduces repair and maintenance costs by replacing aging or obsolete equipment
- Enhances local economy
- Conserves energy resources

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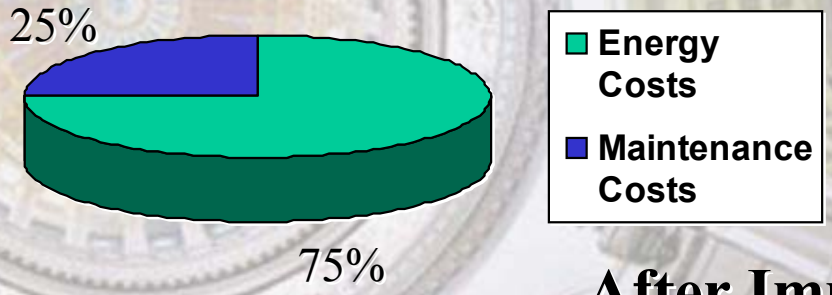
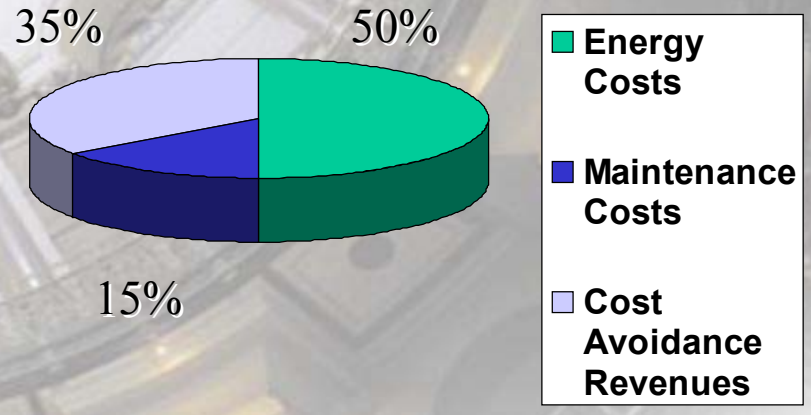
Cost Restructuring with PC

Before Improvements



After Improvements



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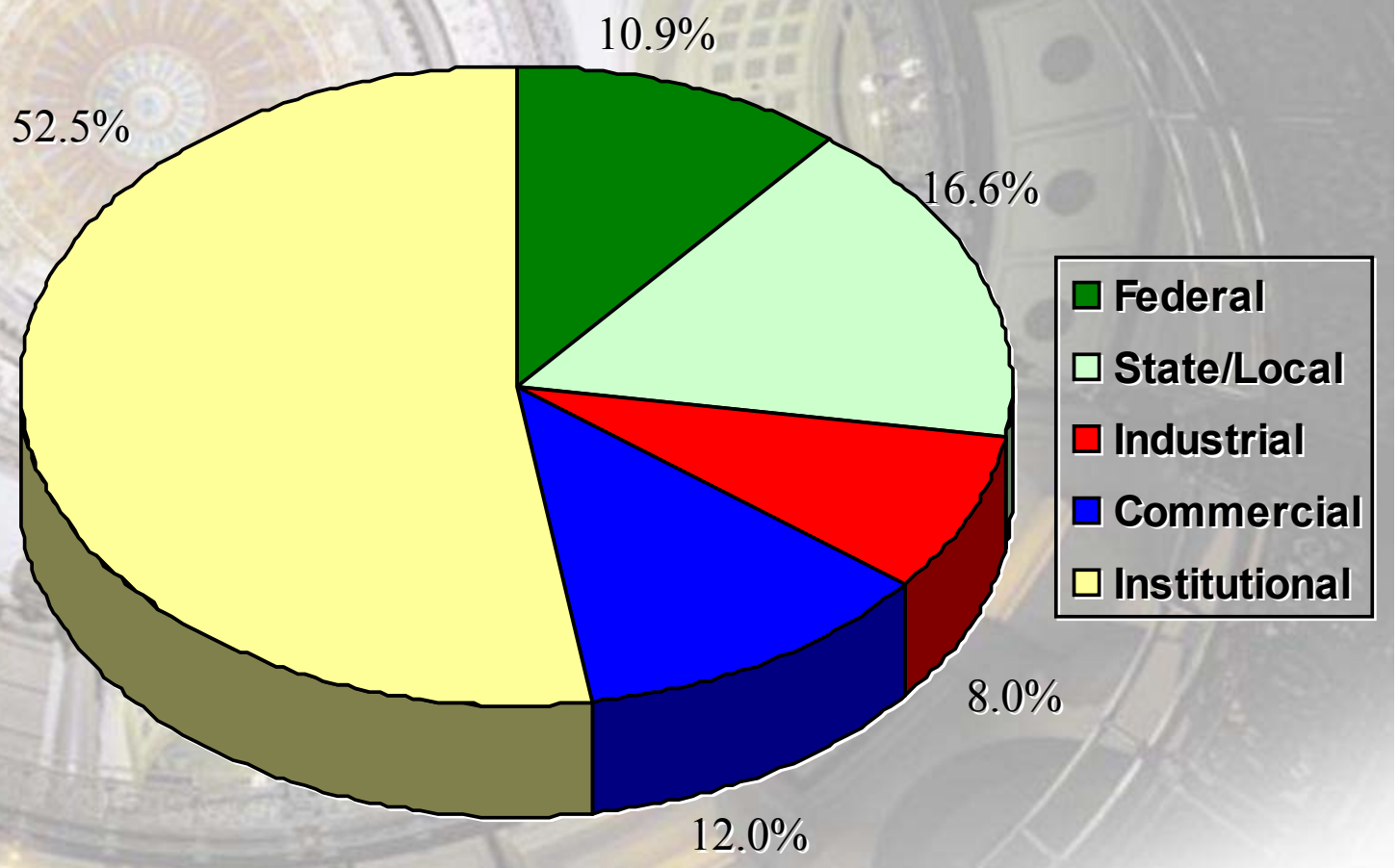
The PC Marketplace



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Important Features of a Performance Contract

- A **single procurement process** with one contractor that is accountable for design, purchase, installation, maintenance and operation of equipment.
- Package includes **financing mechanisms**.
- Provider fees are contingent upon actual level of **cost avoidance revenue** achieved.
- PC Program is supported by **utility bill savings**, **decreased maintenance activities**, and **capital cost avoidance funding** that pays for the improvements.

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The PC Process

- Identify and evaluate energy-saving opportunities
- Conduct feasibility analyses
- Develop engineering designs and specifications
- Guarantee that savings will cover all project costs
- Structure a paid-from-savings program
- Arrange for financing
- Handle purchase and installation of equipment
- Manage the project from design to beneficial use and system monitoring
- Train staff and provide ongoing maintenance services
- Conduct administrative services

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Canyon County ESPC

- $1.4 million in upgrades to 7 buildings, including: Courthouse, Jail Annex, Dale Haile Detention Facility
- Upgrades to building automation system, cooling towers, lighting, replacing outdated equipment
- Reducing energy costs by $120,000 to annual budget of $300,000

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State of Maryland ESPC

- Governor's Executive Orders
- All state-run buildings
- $29 million in savings 1994 to 2010
- Saving 339,00 MW hours and reducing CO_2 by 650,000 tons
- Full scope of PC services
- LEED Silver Level

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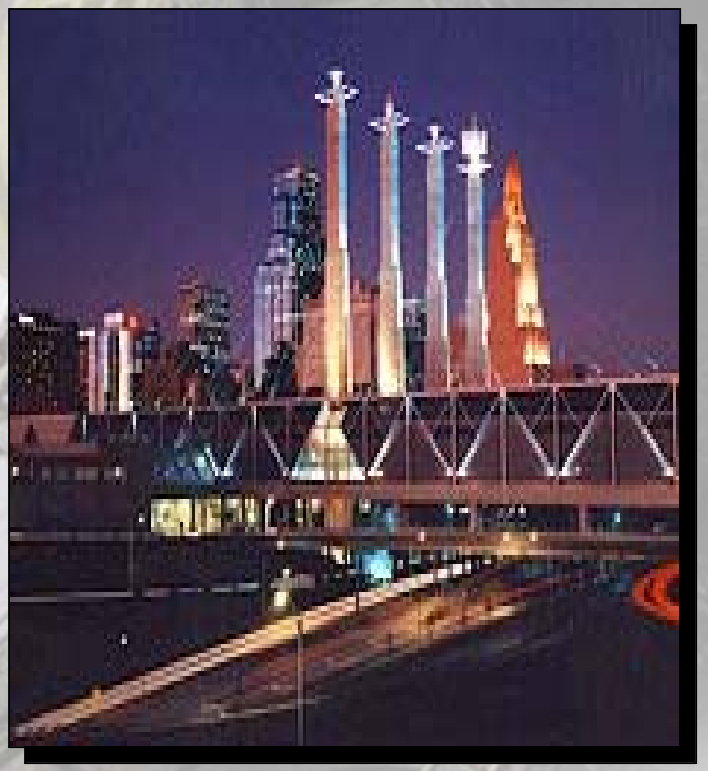
Kansas City Convention Center

- 1.6 million sq ft
- $8.4 million PC
- Upgrades to HVAC, plumbing, lighting
- New building automation system
- Two on-site engineers
- $1.1 million in annual savings



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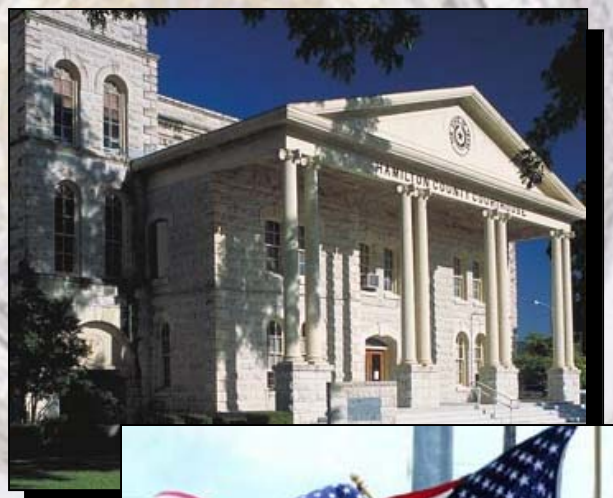
Water Conservation in Hamilton & Crowley, TX



- Replace outdated water meters, add automated meter reading
- Gray water reclamation
- Begun in 1999
- Numerous buildings completed in Cities of Hamilton & Crowley
- Overall 14% reduction in water use
- Revenue loss prevention

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The Next Level for Performance Contracting

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"High Performance" Performance Contracting

- **High Performance Green Buildings**
  - **Builds off of energy efficiency**
  - **Goes to other building utilities and resources**
  - **Takes a total building, integrated approach**
  - **Emphasis on indoor environmental quality and impact on natural environment**
  - **Extends economic measures to total building**

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Characteristics of High Performance Green Buildings

- Optimal energy, environmental and economic performance
- Increased efficiencies saving energy and resources
- Satisfying, productive, quality indoor spaces
- Whole-building design, construction and operation over entire life cycle
- Fully integrated approach – teams, processes, systems

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The U.S. Green Building Council

- A national coalition representing all sectors of the building industry (nearly 3,000 members)
  - Architects
  - Engineers
  - Product Mfrs
  - Building Owners
  - Environmental Groups
  - Utilities
  - Universities
  - Federal, State, Local Government
- Promotes the design, construction and operation of environmentally responsible, profitable, healthy places to live and work
- Launched LEED (Leadership in Energy & Environmental Design) in 2000 (700+ projects)
- Piloting LEED for Existing Buildings 2002 / 03

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LEED Programs

- Building Certification – LEED Certified, Silver, Gold, Platinum
- Professional Accreditation
- Training Workshops
- Educational Resources
- Web Site – www.usgbc.org

U.S. GREEN BUILDING COUNCIL
LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

JOHNSON CONTROLS

LEED Rating System

- **Self-assessing system to guide project development**
- **4 levels of certification**
  - **LEED Certified 26 - 32 points**
  - **Silver Level 33 - 38 points**
  - **Gold Level 39 - 51 points**
  - **Platinum Level52 + points**

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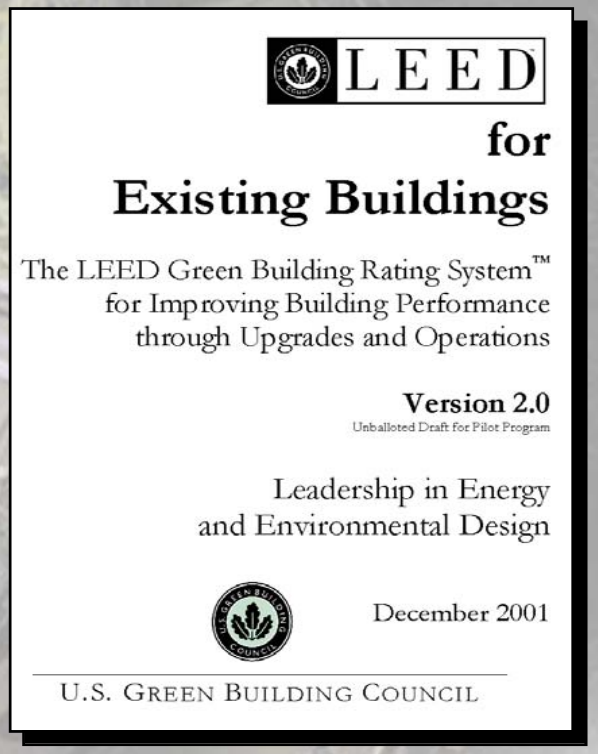
Launch of LEED EB

- **Two drafts with input of an Expert Advisory Group of 167 people representing 119 organizations / companies in all sectors of building industry**
- **Pilot Program Launched Jan. 2002 – 70+ participants**
- **Balloted LEED EB rating system to be launched in March 2003**



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LEED EB Pilot Participants

- National Geographic Society Headquarters
- Pentagon
- State of Maryland
- Kansas City, MO
- Furman University
- US Department of the Interior
- Buffalo Public Schools
- Case Western Reserve University
- Microsoft
- Johnson & Johnson
- Liberty Property Trust
- University of Cincinnati
- Russellville, AR School District
- General Services Administration
- Jackson County, MO
- Emory University

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LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

Categories

Sustainable Sites (22%)

Materials & Resources (20%)

Water Efficiency (8%)

Energy & Atmosphere (27%)

Indoor Environmental Quality (23%)

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Sustainable Sites

Prerequisite

Erosion & Sedimentation Control

Credits

Site Selection

Urban Redevelopment

Brownfield Redevelopment

Alternative Transportation

Reduced Site Disturbance

Storm Water Management

Reduction of Heat Islands

Light Pollution Reduction

Green Site & Building Exterior Management (EB)

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Materials & Resources

Prerequisite

- Storage & Collection of Recyclables
  (Waste Management in EB)

Credits

- Building Reuse
- Construction Waste Management
- Resource Reuse
- Recycled Content
- Local/Regional Materials
- Rapidly Renewable Materials
- Certified Wood
- Occupant Recycling (EB)

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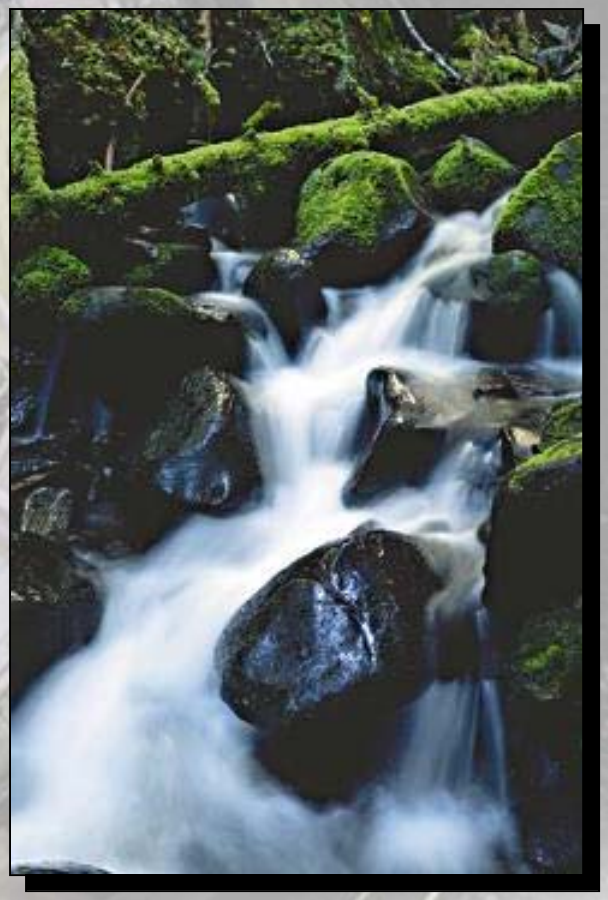
Water Efficiency

Prerequisites

- Minimum Water Efficiency (EB)
- Discharge compliance (EB)

Credits

- Water Efficient Landscaping
- Innovative Wastewater Technologies
- Water Use Reduction



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Energy & Atmosphere

Prerequisites

Building Commissioning

Minimum Energy Performance (EB Adds EPA ENERGY STAR standards)

Ozone Protection (EB)

Credits

Optimize Energy Performance

Renewable Energy

Additional Commissioning

Additional Ozone Protection

Measurement & Verification

Green Power

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Indoor Environmental Quality

Prerequisites

- Minimum IAQ Performance
- Environmental Tobacco Smoke Control
- Asbestos removal/encapsulation (EB)

Credits

- Carbon Dioxide Monitoring
- Increased Ventilation Effectiveness
- Construction IAQ Management
- Low-Emitting Materials
- Indoor Chemical/Pollutant Control (Green Housekeeping EB)
- Controllability of Systems
- Thermal Comfort
- Daylighting / Views
- Contemporary IAQ Practice (EB)

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Government LEED Projects

- **49 of 700+ (7%) LEED NB Registered Projects**
  - **19 California**
  - **9 Southwest**
  - **8 East Coast**
  - **6 Midwest**
  - **4 Mountain States**
  - **2 South**
  - **1 Canada**
- **24 of 74 (32%) LEED EB Registered Pilot Projects**

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LEED EB Case Study

- **Kansas City, City Hall**
  - **29-story, 440,000 sq. ft. building**
  - **Art deco built in 1936**
  - **Green auditing stage**
  - **In LEED EB pilot program**
  - **Currently conducting a $5.4 million PC project to retrofit lighting, plumbing, HVAC, controls**
  - **Realized savings of $71,000 in installation phase – now measuring 1 year savings**

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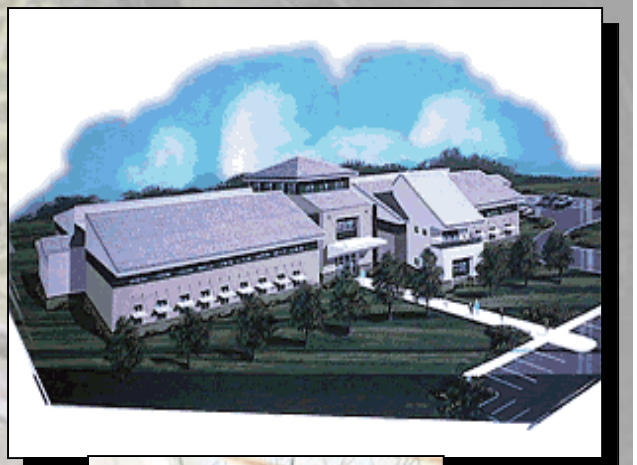
LEED NC Case Study

- **PA DEP Cambria Office**
  - **34,500 sq ft**
  - **Cost $90 / sq ft**
  - **Energy cost is 66% lower than base building cost**
  - **Reduces water consumption by 32.6%**
  - **88% of occupied spaces have 2% or > daylighting with 100% access to exterior view**



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Economic Benefits of Green Design

- **Lower Construction Costs**
  - **Reduced site preparation & landscaping**
  - **Lower waste disposal costs by 50% to 98%**
- **Reduced Operating Costs**
  - **Lower utility costs by 20% to 50%**
  - **Up to a 25% reduction in life cycle costs**
- **More Productive Environment**
  - **Better tenant & worker attraction/retention**
  - **Less absenteeism by 45%**
  - **Higher productivity up to 16%**

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Economic Benefits of Green Design

- **Higher Valuation of Building**
  - **Up to $4 increased valuation for every $1 spent**
- **Higher Visibility & Marketability**
- **Reduced Insurance & Risk of Liability**
  - **Healthier indoor environment**
  - **Greater occupant satisfaction**
  - **Lower natural environmental impacts**
  - **Streamlined regulatory approvals**

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State and Local Sustainable Efforts

- Green buildings in context of **sustainable development** (Smart Growth, energy policy, etc.)
- **Legislation** for sustainability & energy efficiency
- **Executive orders** from elected officials
- **Revised building codes** include green principles
- **Offices** of Sustainability and Environment
- **Public benefit charges** are an emerging trend
- **Tax incentives** for building green
- **Sustainable language** in project proposals / RFPs
- Growing adoption of **LEED** Rating System

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Value Proposition of Green

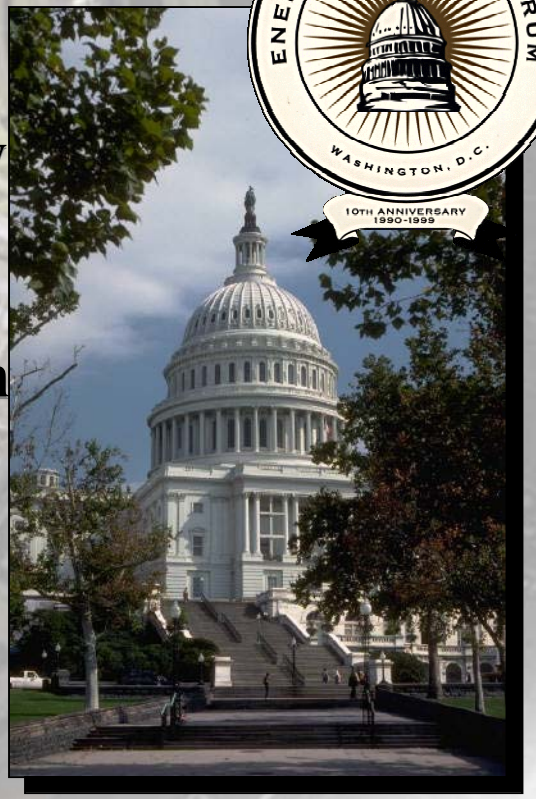
- **Good fiscal management**
  - **Cost savings save taxpayer dollars**
- **Excellent quality of life**
  - **Quality building environments**
- **Potential for economic development**
  - **New markets for green technologies**
- **Sound environmental stewardship**
  - **Waste and treatment cost reduction**
  - **Reduced air and water pollution**
  - **Energy efficiency and renewable use**

JOHNSON CONTROLS

Initiatives on Energy and the Environment

Energy Efficiency Forum

- 400 industry executives, government officials and new media
- National dialog on energy, economy and the environmen held in Washington, D.C.
- 14th Forum in June 2003
- Sponsored by the USEA and Johnson Controls



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Initiatives on Energy and the Environment

ENERGY STAR®

- Voluntary program sponsored by U.S. EPA
- Participants agree to implement energy-efficient technologies to earn ENERGY STAR Label
- They receive national and local recognition

Rebuild America

- A voluntary program of the U.S.DOE
- Engages diverse groups in developing energy savings initiatives
- Promotes performance contracting to local and state governments and other groups

Energy Services Coalition

- Promotes energy savings PC contracts
- Links building owners/operators with ESCOs
- 29 States Energy Offices represented
- Rebuild America Strategic Partner

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Rebuild Hawaii

Hawaii Performance Contracting Workshop 2003

Hawaii ESPC Projects

What has Been Done & Lessons Learned

City & County of Honolulu

Honolulu Hale

Scope

- City Hall and Annex Buildings
- Central Cooling Plant & Cogeneration System
- Lighting Retrofit - Office & Historic
- AHU Replacements / Upgrades
- City LAN Networked Building Control System

Financing

- Bond - Energy Program Funded
- Electric Utility Rebates

Status

- Central Plant/ Lighting Completed 6/02
- Cogeneration Unit online planned for 4/03

Allyn Lee - DDC Project Engineer

City & County of Honolulu

Honolulu Hale

Benefits

- Improved work environment with additional cooling capacity, temperature control and better lighting.
- New reliable equipment
- Flexible Equipment Scheduling
- Data for Commissioning / Diagnostic Work
- 39% reduction in energy usage

Lessons

- Adapted existing Contracts Administration methods (design / construction / services)

Improvements

- Include C&C CAD & Construction standards
- “One-Time Review” building permit procedures

Allyn Lee - DDC Project Engineer

City & County of Honolulu

Traffic Signal Systems

Scope

- Over 400 Intersections on Oahu
- LED Signal Module Retrofit (Red / Green)
- TraffiCenter Lighting Retrofit

Financing

- Bond - Energy Program Funded
- Electric Utility Rebates

Status

- Completed 10/02

Allyn Lee - DDC Project Engineer

City & County of Honolulu

Traffic Signal Systems

Benefits

- Improved Public Safety
- Increase productivity through reduced maintenance and emergency call outs
- 45% reduction in overall energy usage
- Correction of Metering/Billing issues

Lessons

- Contractors with Task Specific Experience
- Close installation coordination to resolve existing condition situations in the field.

Improvements

- Independent Consultant to review ECMs
- Equipment & Construction Subcontractor Bidding
- Utilize the Availability of Third-Party Financing

Allyn Lee - DDC Project Engineer

County of Hawaii

County Building

Scope

- New Chillers
- Re-configured Chilled Water Plant Piping
- Schedule & Bypass Control
- Airflow Improvement in Council Chambers
- Energy-Efficient Lighting Retrofit

Financing

- Self-Funded - Energy Program
- 10 years - Municipal Lease

Status

- Completing 6 years of Guarantee

Ray Carr - Energy Manager

County of Hawaii

County Building

Benefits

- **Improved & More Reliable Air Conditioning & Lighting Systems**
- **Replaced existing Breakdown Maintenance with full-service Preventative Maintenance**
- **Flexible Time Scheduling**
- **Significant Energy Usage & Demand Reduction**

Lessons

- **Be very clear with how Rebates will apply**

Ray Carr - Energy Manager

County of Hawaii

Phase I & II

Scope

- Energy-Efficient Lighting for Police & Fire Facilities throughout the Big Island
- New Chiller Plants at Hilo & Kona Police Stations. Some new Air Handlers.
- Improved Air Conditioning Control at Hilo & Kona Police Stations

Financing

- 10 yr. - Self-Funded - Municipal Lease - Energy Programs w/ Additional work funded by Bond

Status

- Ph. I - Completing 3 years of Guarantee
- Ph. II - Completed 1 year of Guarantee

Ray Carr - Energy Manager

County of Hawaii

Phase I & II

Benefits

- **Improved & More Reliable Air Conditioning & Lighting Systems**
- **Replaced existing Breakdown service with full-service Preventative Maintenance**
- **Significant Energy Usage & Demand Reduction**
- **Solved Hilo Dispatch Room A/C Deficiencies**

Lessons

- **ESPC is a very positive way to improve infrastructure and save energy**

Ray Carr - Energy Manager

County of Kauai

Various County Facilities

Scope

- Energy-Efficient Lighting Retrofit throughout various locations
- Centralized controls at Civic Center

Financing

- Self-Funded - Energy Program
- 10 years - Municipal Lease

Status

- Finalized 10-year Payout based upon stipulated savings projection

Glenn Sato - Energy Coordinator

County of Kauai

Various County Facilities

Benefits

- Improved work conditions
- Improved recreational conditions
- Improved reliability of lighting systems

Lessons

- Maintenance Savings is pivotal in allowing for work in Wastewater and Water Departments
- Partnering is crucial

Glenn Sato - Energy Coordinator

University of Hawaii Hilo

Scope

- University Campus with over 50 buildings
- Lighting Systems Retrofit
- High Efficiency Chiller / Tower / Pumping
- Mechanical Systems Repairs
- On-Site Building Specialist

Financing

- 10 year Commercial Lease

Status

- Completed 1997
- Ongoing Service until 2007

Jun Haruki - Project Engineer

University of Hawaii Hilo

Benefits

- Improved Lighting Quality & Uniformity
- Greatly Reduced Service Backlog
- Chiller Loop Expansion (Campus Center & Student Services off of Air-Cooled Chillers)
- Improved environmental controls including remote scheduling

Lessons

- Discussion of financing options early in Process
- Flexibility in dealing with operational issues

Improvements

- Spend more time on maintenance scopes & roles
- Include Critical Systems Spares Review

Jun Haruki - Project Engineer

University of Hawaii Community Colleges

Kauai Community College

Scope

- New Chillers & Variable Primary Chilled Water Loop Pumping
- Improved Air Conditioning Control with central DDC System
- Power Factor Correction

Financing

- Capital Funding

Status

- Completing 3rd Year of Guarantee

Dien Truong - Project Manager

University of Hawaii Community Colleges

Kauai Community College

Benefits

- **Improved & More Reliable Air Conditioning Systems**
- **Replaced existing Breakdown service with full-service Preventative Maintenance**
- **Significant Energy Usage, Demand & Billing Reduction**

Lessons

- **Never give up on Performance Contracting**

Dien Truong - Project Manager

University of Hawaii Community Colleges

Honolulu Community College

Scope

- **New Chillers, Pumps & Primary-Secondary Chilled Water Loop Pumping**
- **Improved Air Conditioning & Variable Speed Control with central DDC System**
- **Chemical-Free condenser water treatment**
- **New Window AC Occupancy Sensors**

Financing

- **Capital Funding**

Status

- **In 2nd Year of Guarantee**

Dien Truong - Project Manager

University of Hawaii Community Colleges

Honolulu Community College

Benefits

- **Improved & More Reliable Air Conditioning Systems**
- **Replaced existing Breakdown service with full-service Preventative Maintenance**
- **Energy Usage & Demand Reduction**

Lessons

- **UH Procurement process requires patience**

Dien Truong - Project Manager

HAWAII HEALTH SYSTEMS
CORPORATION

"Touching Lives Everyday"

Scope

- Healthcare System with ten facilities on five different islands.
- Cogeneration to meet 80% of facility electrical needs, 100% of facility hot water load, and supplement chilled water production via absorption chiller.
- Air conditioning system improvements include high efficiency chillers and variable volume chilled water operation.

Financing

- Customer furnished financing via municipal lease

Status

- Kona Community Hospital substantially complete. Chiller retrofit complete early 2002. Cogeneration system fully operational February 2003.

HAWAII HEALTH SYSTEMS
CORPORATION
"Touching Lives Everyday"

Status (cont'd)

- Hilo Medical Center 80% complete. Cogeneration system scheduled to go on line April 2003
- Kauai Veteran's Memorial Hospital 40% complete. Cogen system scheduled to go on line June 2003.
- Maui Memorial Medical Center and Samuel Mahelona Memorial Hospital in development.

Benefits

- Cogeneration systems provide for additional redundancy of electrical systems.
- New equipment (chillers, pumps, cooling towers, lighting, etc.) replaced aging equipment without capital funds expenditure.
- New energy management systems installed to allow for improved control and monitoring of electrical and mechanical systems throughout each facility.

HAWAII HEALTH SYSTEMS
CORPORATION
"Touching Lives Everyday"

Benefits (cont'd)

- **Energy savings reduce demand on hospital electrical distribution system, providing additional expansion capacity.**
- **Comfort and maintenance problems reduced with upgrades to building and equipment.**
- **Positive cash flow throughout term of contract.**

Lessons

- **Economics of cogeneration are better with systems sized for electrical and thermal baseload.**
- **Synergistic benefits from combined effects of upgraded central plant, controls, and cooling load reduction.**
- **Detailed engineering uncovers unresolved problems in original design - Upgrades can improve performance.**

State of Hawaii - The Judiciary

Judiciary Courthouses

Scope

- Five Buildings on Maui and Oahu
- Over 500,000 square feet of Office, Meeting and Courtroom facilities
- Lighting Retrofit

Financing

- 10 year Third-Party Municipal Lease

Status

- Contract Award 10/02
- Construction Award 2/03

Jonathan Wong - Contracts Administor

State of Hawaii - The Judiciary

Judiciary Courthouses

Benefits

- Improve work environment with higher Lighting Levels and better color rendering
- Eliminate unoccupied lighting of rooms with Occupancy Sensors
- Reduce Maintenance requirements with standardization of lamp & ballasts.

Lessons

- Participation in Team Meetings essential
- Building Manager /User Meetings
- Sample Retrofit was Beneficial

Improvements

- Set internal deadlines for review/comments

Jonathan Wong - Contracts Administor

State of Hawaii - Department of Defense

Hawaii Army National Guard

Scope

- 40+ Facilities on Oahu, Big Island, and Kauai
- Lighting Retrofits
- Air Conditioning Plants
- Waste Heat Recovery for Hot Water Systems
- Photo-Voltaic Electrical Generation

Financing

- Proposed Third-Party Municipal Lease
- Electric Utility Rebates

Status

- Energy Audits Complete
- ECM selection and feasibility analysis

Ken Stacy - Energy Manager

State of Hawaii - Department of Defense

Hawaii Army National Guard

Benefits

- **Need Capital Improvements to Replace Failing A/C systems**
- **Improved work environment with Upgrade of Lighting Systems**
- **Improve Site and Asset security with lighting systems**
- **Provide Central Control and monitoring of Energy and Environmental Conditions**

Lessons

- **Full-time person needed to facilitate coordination with Multiple Users / ESCO**

Ken Stacy - Energy Manager

United States Air Force

Hickam Air Force Base

Scope

- **Two Task Orders:**
  - **HVAC Equipment & Control Retrofit**
  - **Energy-Efficient Lighting Retrofit**
  - **Water Conservation**
  - **Radiant Barrier**
  - **Solar Attic Fans**

Financing

- **Self-Funded - Energy Program**

Status

- **Task Order 1 - 2nd Year of Guarantee**
- **Task Order 2 - Implementation Complete Feb. '03**

Dave Stiner - Energy Manager

United States Air Force

Hickam Air Force Base

Benefits

- **Improved & More Reliable Air Conditioning Systems**
- **Improved control & diagnosis of Air Conditioning systems**
- **Improved comfort for residents**
- **Electricity, Water & Sewage - Usage & Demand Reduction**

Lessons

- **9/11 Affects Everything**

Dave Stiner - Energy Manager

United States Army Medical Command

Tripler Army Medical Center

Scope

- Chilled Water Pumping Improvements
- Hot Water Recirc. Loop Steam Heat Exchanger
- Chilled Water Loop Extension
- Air Handler Upgrades (VFD/Static/Motors)
- Computer Room DX to Chilled Water Cooling

Financing

- 23 year Third-party Lease
- Utility Rebates

Status

- Phase 1 Completed 1/03
- Phase 2 in Proposal Stage

Myron Oh - Facilities Director

United States Army Medical Command

Tripler Army Medical Center

Benefits

- **Mission Critical Capital Improvements Funded by Energy Savings**
- **First Task Order Proved working relationship, worked out processes and demonstrated Improvements work**
- **Provided infrastructure for follow on projects**
- **Improved Exterior Aesthetic Conditions**

Lessons

- **Vision of Facilities needs & goals communicated**
- **Trust and clear communications during project development**

Improvements

- **Clearly define payment / funding processes**

Myron Oh - Facilities Director

United States Navy

Naval Region Southwest

Scope

- Approximately $20 Million
- Technologies:
  - HID Lighting
  - Controls
  - HVAC
  - Micro-turbines
  - 750kW PV Array
  - Irrigation

Financing

- ESPC
- State Incentives
- Office of the Secretary of Defense

Chris Lippert- Deputy Energy Program Manager, Tetra Tech EMI

United States Navy

Naval Region Southwest

Benefits

- Better Working Conditions
- No Capital Outlay for Projects
- Implement Innovative Projects
- Quality Projects

Lessons

- The Activity Must Participate in the Process
  - Guide Audits
  - Decide What Qualifies as Savings
  - Involve Stakeholders Early in the Process
  - Take an Active Management & Review Role
  - Get Expert Help With M&V Planning / Execution
  - Plan Post Construction Roles for the Life of the Contract

Chris Lippert- Deputy Energy Program Manager, Tetra Tech EMI

United States Marine Corps

Marine Corps Base Hawaii

Scope

- Bachelor housing and dining facilities
- Hot water from A/C waste heat recovery
- High-efficiency chiller
- Direct Digital Controls

Financing

- $2.3M ESPC financing
- $1.2M Environmental funds (cost avoidance)
- HECO rebates

Status

- Completed ~12/01
- Amortization to 3/08

Bill Nutting - Energy Manager

United States Marine Corps

Marine Corps Base Hawaii

Benefits

- Demolition of 2 large steam plants
- Elimination of 4 boiler watchstander positions
- Avoid $1.2M fuel spill containment costs
- Annual Savings: $60K energy, $306K maintenance, & $218K operations

Lessons

- Think “out of the box”, basic requirements
- Re-use waste energy instead of new energy

Improvements

- Central control and monitoring of energy use

Bill Nutting - Energy Manager

United States Marine Corps

Marine Corps Base Hawaii

Scope

- Lighting retrofit, 49 buildings
- Lighting retrofit, 350 family housing units
- Daylighting controls, 5 hangars
- A/C waste heat recovery, 6 bachelor housing buildings

Financing

- $1.7M ESPC financing
- HECO rebates

Status

- Completed ~10/02
- Amortization to 10/12

Bill Nutting - Energy Manager

United States Marine Corps

Marine Corps Base Hawaii

Benefits

- Better quality, more efficient lighting
- Lighting off when daylighting sufficient
- Recover waste heat for domestic hot water
- $110K annual energy savings

Lessons

- Re-use waste energy instead of new energy
- Include the “obvious” – reduce wattage of lighting controlled where feasible

Improvements

- Central control and monitoring of energy use

Bill Nutting - Energy Manager

City and County of Honolulu

JOHNSON CONTROLS

Honolulu Hale

Energy Conservation Project

February 26, 2003

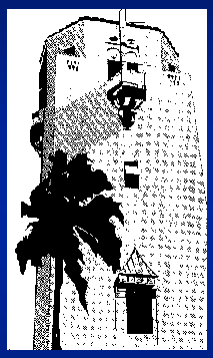
Facility Challenges

- Support of critical public service activities
- Aging physical plant equipment (25 yrs)
- Energy & operational inefficiencies
- Comfort & productivity issues
- Deferred maintenance
- Regulatory requirements
- Risk management
- Required system uptime

Honolulu Hale

530 South King Street Honolulu, Hawaii 96813

City & County of Honolulu's City Hall



Financial: $ 3.1 M Cost $ 125,000/yr. Savings

ECMS: High-Efficiency Centrifugal Chillers

220 kW Cogeneration System with 70 ton Absorption Chiller.

Induced Draft Cooling Tower

Primary/Secondary Chilled Water Loop with Variable-Speed pumping

T8, Elec. Ballasts, Compact Fluorescent lamps LED Exit signs, Occupancy sensors.

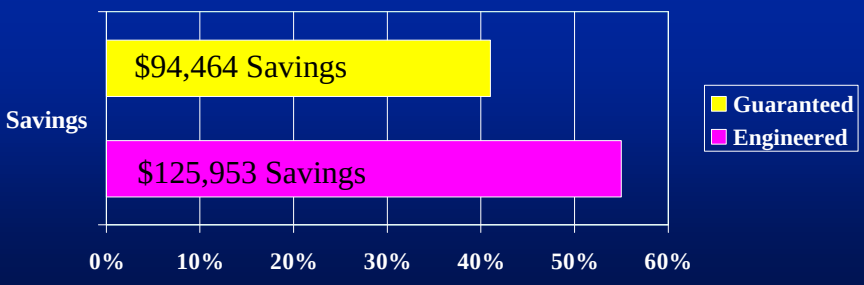
2-way Chilled Water Valve Change & Digital Temperature Control Retrofit.

Energy Management System

Electrical Cable Replacement

Proposed Energy Expenditure Savings

- **Energy Cost Reduction -** Guaranteed Annual Utility Cost Reduction of **41%**
- **Meet C&C of Honolulu Goals -** Significant Step towards Energy Reduction & Operational Flexibility Goals



Energy Conservation Measures

ECMs

- **ECM 1.1: Lighting Retrofit - Office Areas**
- **ECM 1.2: Lighting Retrofit/ Replacement - Public Areas**
- **ECM 2.1: Chiller Plant Replacement**
- **ECM 3.1: Energy Management System / AHU Valves and DDC Controllers**
- **ECM 4.1: Cogeneration System**

ECM 1.1 & 1.2 Lighting Retrofits

- **Office Lighting**
- **Architectural Lighting**

- T-8 Lamps w/Electronic Ballasts, Compact Fluorescent Lamps LED Exit Signs Occupancy Sensors
- Install Correct Period Fixtures
- Improve Lighting levels and Quality for Improved Work Environment
- Reduce Lighting Maintenance Costs

ECM 2.1 Central Plant Replacement

- **Chillers & Cooling Tower**
- **Pumping Systems**

- Replace Failing Equipment and meet Cooling Requirements
- Increase Operational Flexibility
- High-Efficiency Chillers
- Induced Draft Cooling Tower
- Primary/Secondary Pumping
- New Electrical Cables to meet Building Code requirements

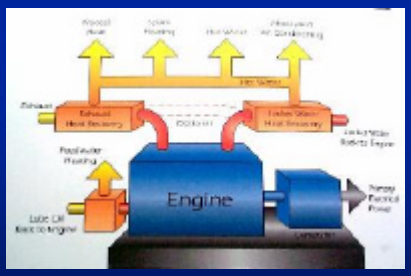
ECM 3.1 New AHU Valves & DDC Control

- **New Energy Management System**
- **Digital Temperature Control**

- Replace Failing Equipment and Improve Temperature Control for Productivity and Comfort Requirements
- Increase Operational Flexibility & Scheduling Abilities
- Quicker response to Hot & Cold Calls
- New AHU Control Valves
- Digital Controllers tied to Energy Management Control System Network

ECM 4.1 Cogeneration System

- **220kW Cogenerator**
- **55 ton Absorption Chiller**



• Increase Operational Flexibility with flexible Cooling Capacity and Fuel Selection Choice

• Reduced Operational Costs

•Increase ability to operate facility during power outages

• Reduce "On-Peak" Electrical Demand to help defer future power plant & power line construction

Estimated Utility Rebates

- **HECO Energy Solutions for Business Program**
- **Schedule Meeting with HECO to Discuss Refining Rebate Levels**
- **Estimated Rebates**

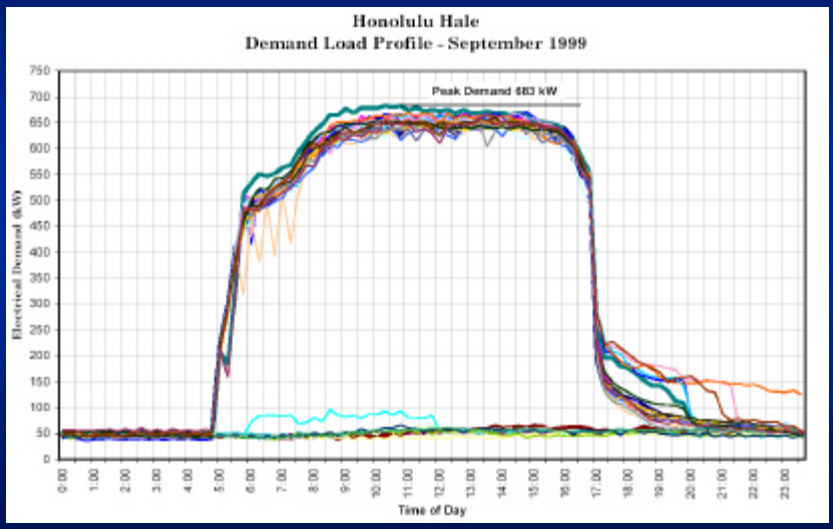
• Funding Approved through 2000.
• Applied for a five year extension.

• Discussion about rebates
(Custom versus Prescriptive)
• Submit Applications

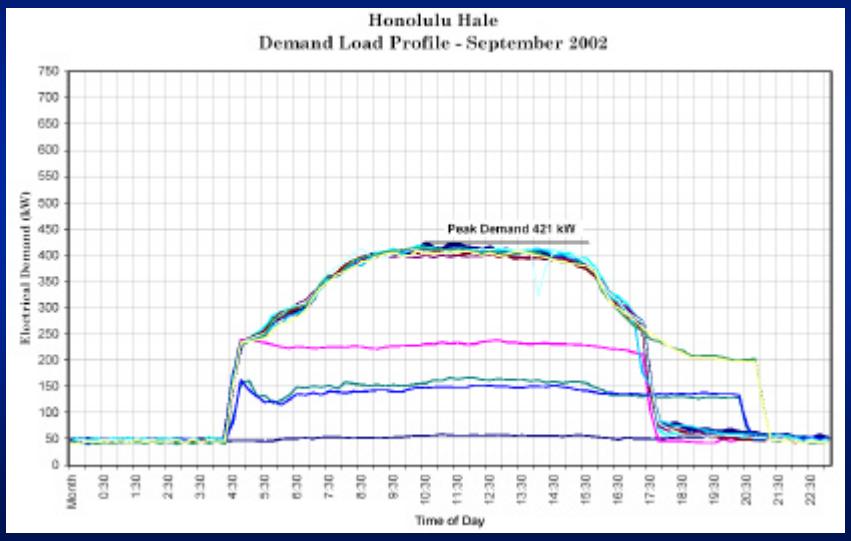
Prescriptive
- • Lighting = $14,112
- • Motors = $802
- • Chillers = $18,750

Custom
- • Study = $10,000
- • Lighting/HVAC = $20,872

Electrical Load Profile - Sept. 99



Electrical Load Profile - Sept. 02



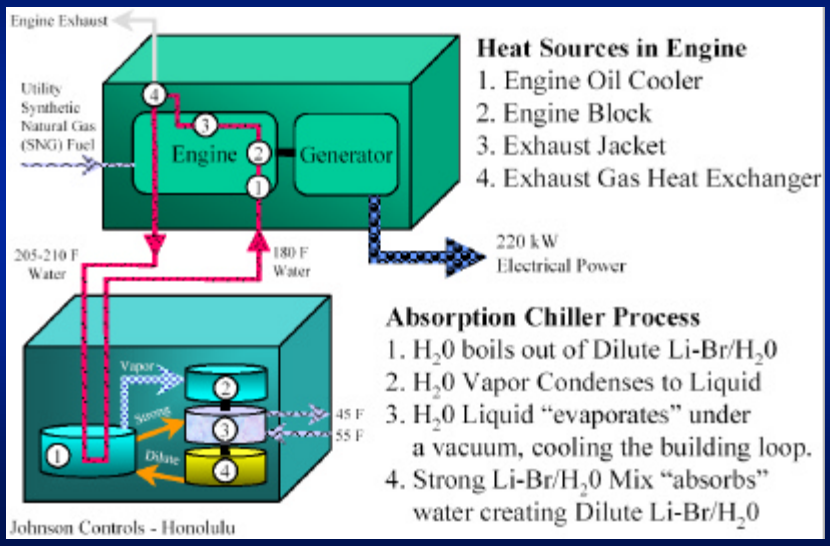
Hallway Lighting Before & After

Old & New Chillers

220 kW Cogeneration Unit

55 ton Absorption Chiller

Cogeneration Schematic



Heat Sources in Engine

1. Engine Oil Cooler
2. Engine Block
3. Exhaust Jacket
4. Exhaust Gas Heat Exchanger

Absorption Chiller Process

1. H_20 boils out of Dilute Li-Br/H_20
2. H_20 Vapor Condenses to Liquid
3. H_20 Liquid "evaporates" under a vacuum, cooling the building loop.
4. Strong Li-Br/H_20 Mix "absorbs" water creating Dilute Li-Br/H_20

Courtyard Before & After

Mahalo

Are there any Questions?

Allyn Lee
C&C Honolulu Design & Construction
650 South King Street, 9th fl.
Honolulu, Hawaii 96813
Phone (808) 523-4106
email: alee2@co.honolulu.hi.us

Hawaii Performance Contracting Workshop 2003
Products & Services

Elizabeth S. Raman
State of Hawaii
Department of Business,
Economic Development, and Tourism
Energy, Resources, and Technology Division
eraman@dbedt.hawaii.gov

What Is Energy Savings Performance Contracting?

- Government and Private-sector partnership.
- Private sector company – pays or arranges financing for up-front cost of purchasing and installing energy efficient equipment.
- State – repays private company over term of contract from energy cost savings; in other words, paying for performance.

DBEDT's Role

- Act as Catalyst for the program.
- Prepare enabling legislation and amendments as required.
- Provide technical assistance to assist facility through entire process.
- Maintain "Guide to Energy Performance Contracting."
- Conduct workshops on technical issues.

Enabling Legislation

Chapter 36-41 Hawaii Revised Statute (HRS) "Energy Retrofit and Performance Contracting for Public Facilities"

Directs all agencies (including counties, the Judiciary and the University of Hawaii) to evaluate and identify energy efficient retrofits that can be implemented through performance contracting . Allows agencies to keep energy savings.

(www.capitol.hawaii.gov/hrscurrent)

Enabling Legislation

Part II. Chapter 196 HRS "Energy Efficiency in State Facilities"

Provides goals for energy efficiency improvements in state facilities through the use of Energy Savings Performance Contracts, utility energy-efficiency service contracts, ENERGY STAR and other energy efficient products. (www.capitol.hawaii.gov/hrscurrent)

Enabling Legislation

Chapter 37D HRS "Management of Financing Agreements"

Establishes a centralized master lease-financing program for, among other things, energy retrofits at favorable tax exempt rates. Has not yet been implemented for energy retrofits. Third party financing is being used for some state projects. (www.capitol.hawaii.gov/hrscurrent)

Procurement

- Energy savings performance contracts are fixed price, multi-year service contracts
- An energy savings performance contract solicitation is a competitive sealed proposal and should comply with HAR Title 3, Subchapter 6
- Key elements of the Request for Proposals include
  - Scope of services and specifications
  - Contractual terms and conditions
  - Instructions for submission and information for proposers
  - Description of evaluation criteria
  - Facility information

Key Elements of Energy Savings Performance Contracts

- Agency keeps savings, they do not revert to the General Fund;
- Term of contract limited to 15 years;
- Annual allocation dependency clause must be included;
- Agency shall receive title to equipment financed;
- Level of payments to contractor is contingent upon measured energy cost savings; and
- Total costs shall not exceed total savings.

Potential savings

Facility	Project Size	Estimated Annual Savings
Judiciary (5 buildings)	$1.5 million	$250,000
Hawaii Army National Guard	Under study	Under study

Active Projects

Facility/Location	Project Size ($)	Annual Savings ($)
UH-Hilo	2.9 million	450,000
Hawaii County Bldg	0.5 million	65,000
Hawaii Fire & Police Stat.	0.4 million	51,000
Hilo & Kona Public SafetyBldgs	1.3 million	140,000
County of Kauai Bldgs	0.5 million	68,000
Honolulu Hale	3.0 million	119,000
Hawaii Health Systems Corporation	10.7 million	1.1 million

Lessons Learned

- Measure energy savings not energy cost savings
- Communications are critical at all levels
- Find an on-site or agency champion
- Aggregate facilities
- Long-term contract
- Technology should be simple to operate and maintain
- An energy performance contract is a partnership between the agency and the ESCO

References

Guide to Energy Performance Contracting and Supplement on Measurement & Verification www.hawaii.gov/dbedt/ert/epc.html

International Performance Measurement and Verification Protocol www.ipmvp.org

FEMP Measurement and Verification Guidelines for Federal Energy Projects, Version 2.2 www.osti.gov/bridge

Energy Savings Performance Savings Contracting Workshop February 26, 2003

FEMP Resources

Eileen Yoshinaka, U.S. Department of Energy

FEMP
FEDERAL ENERGY MANAGEMENT PROGRAM

Resources to Support ESPC Programs

- DOE Regional Office liaison to support Rebuild or FEMP SEP grants
- DOE FEMP Team support of education, and facilitating (agency technical consultant) ESPCs
- ESPC Tools & ESPC Workshops
  - http://www.eren.doe.gov/femp/financing/espc.html
  - Call EREC 1-800-363-3732
  - http://www.escperform.org

FEMP
FEDERAL ENERGY MANAGEMENT PROGRAM

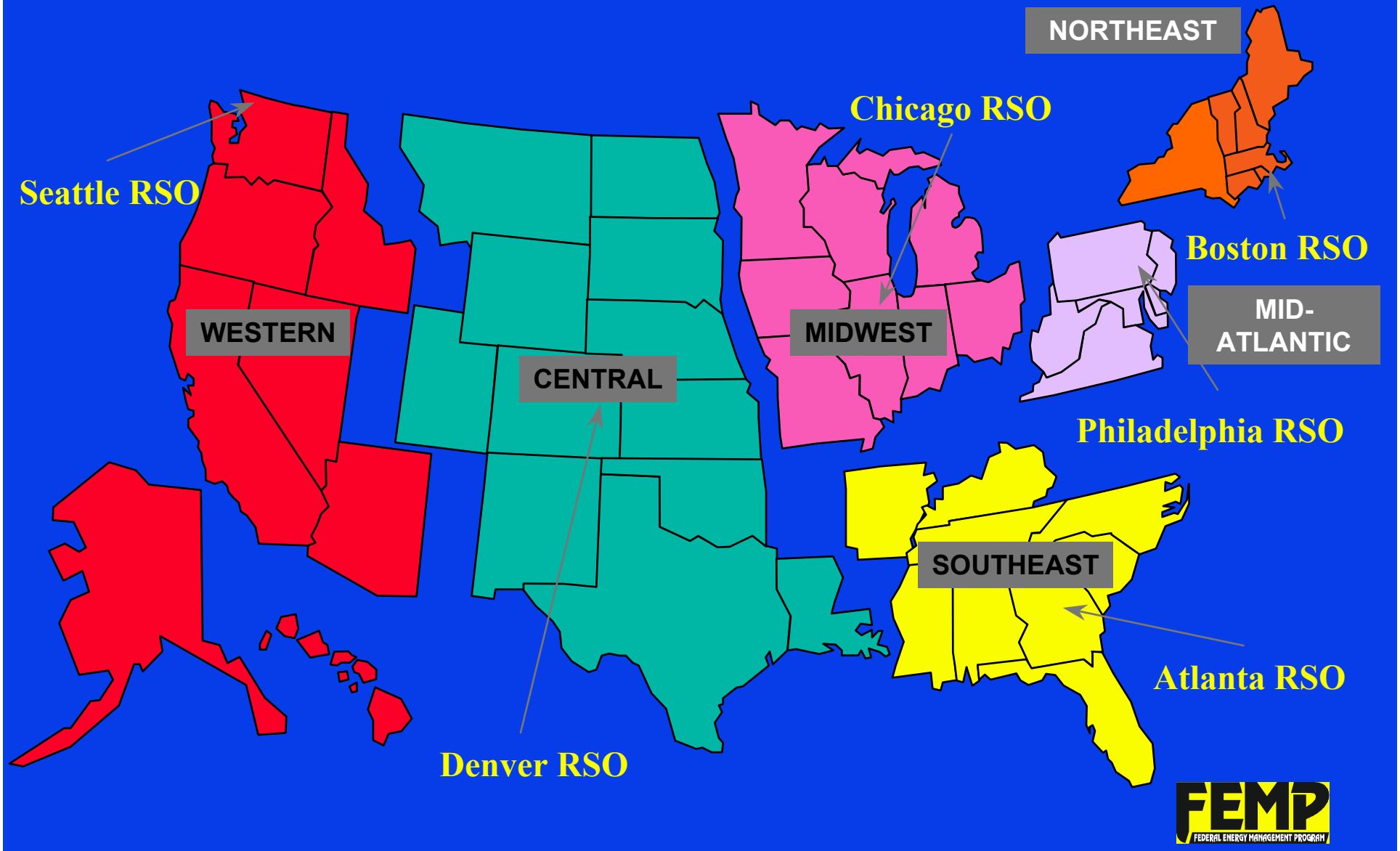
DOE Regional Office Support

- Contact the FEMP staff at DOE Regional Office for your region (see map)

- RO Contacts will coordinate with RO staff responsible for supporting FEMP or Rebuild SEP grants

FEMP
FEDERAL ENERGY MANAGEMENT PROGRAM

Super ESPC Contracts
DOE Regions and Regional Support Offices



DOE FEMP Contacts - Seattle

- Seattle
  - Cheri Sayer (206) 553-7838, Scott Wolf (206) 553-2405

DOE FEMP Technical Support for ESPCs

- Contact the FEMP staff at DOE Regional Office for your region (see map and contact list)
- Indicate you're seeking FEMP Services for Project Facilitation support to your ESPC project
- FEMP RO Contacts can provide a menu of FEMP services tailored to meet your needs
- DOE FEMP Services are provided on a reimbursable basis (~$100/hr) for National Laboratory ESPC experts

FEMP
FEDERAL ENERGY MANAGEMENT PROGRAM

FEMP Services – ESPC Project Facilitation

- **Project Facilitation Services typically include:**
  - Support State Education of Customer Sites on ESPC
    - Process, Benefits, Risks, Acquisition Strategies & Planning
  - Site screening for ESPC opportunity
  - Assistance with RFP development (technical issues)
  - Agency technical advice during Customer/ESCO meeting(s)
  - Review/comment on ESCO proposals
  - Consultation on proposal revisions & negotiation
  - Review/comment on ESCO Design & Construction Plans
  - Review/Comment on Post-Installation M&V & Acceptance
  - Review/Comment on first year M&V

FEMP
FEDERAL ENERGY MANAGEMENT PROGRAM


ENERGY$OLUTIONS℠
FOR BUSINESS
Hawaii Performance Contracting Workshop
Hawaiian Electric Company
Energy Services Department
2003

Energy Efficiency Efforts

- Since 1996 HECO's Commercial and Industrial Customers Have Invested Over $59 Million in Energy Efficiency Improvements

ENERGY$OLUTIONS℠
FOR BUSINESS

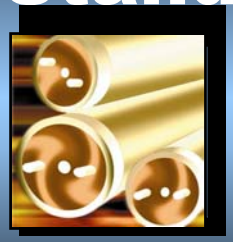
Benefits of having a Rebate Program

- Lowers our client's capital costs for energy efficiency improvements
- Lowers our client's electric bills
- Allow HECO to Deferrer of building of the next power plant

Two Types of Rebate Applications

ENERGY$OLUTIONS℠
FOR BUSINESS

Standard Rebates

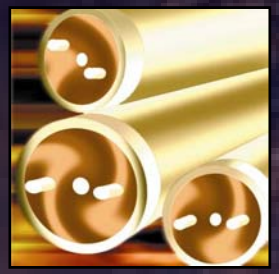


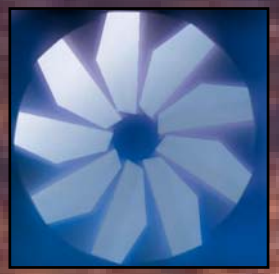
- Existing Facilities
- New Construction

Customized Incentives

- Existing Facilities
- New Construction

Qualifying Technologies
Standard Rebates





- LIGHTING
  - T-8 Lamps and Electronic Ballasts
  - Reflectors & De-Lamping
  - Occupancy Sensors
  - Indoor Metal Halide/High Pressure Sodium Fixtures
- PREMIUM EFFICIENCY MOTORS
- HIGH EFFICIENCY AIR CONDITIONING

Second Type of Rebate Application

ENERGY$OLUTIONS℠
FOR BUSINESS

Standard Rebates

- Existing Facilities
- New Construction

Customized Rebates

- Existing Facilities
- New Construction

Customized Rebate

Example Projects

- Complex Lighting Designs (e.g. Compact Fluorescent, Daylighting, Dimming Controls)
- Adjustable Speed Drives (VFDs)
- Waste Heat Recovery
- Heat Pump Water Heaters (Vs. Electric Resistance)
- Solar Window Film
- HVAC Optimization
- Energy Management Systems

5 Simple Steps to Participate

- Identify energy saving opportunities
- Contact vendors/engineers
- Apply for incentive
- Install equipment
- Receive cash incentive

Summary

- Many Technologies Qualify
- We Will Work With You and your contractor
- Call Your HECO Account Manager
- Or call 94-POWER for the new *Energy$olutions* Power CD


ENERGY$OLUTIONS™

Rebuild Hawaii

Hawaii Performance Contracting Workshop 2003

ESPC Project Components

What is involved with:

Energy Studies

Project Financing

Measurement & Verification

Energy Studies

Types
Scope
Work
Time Frame
Accuracy

- **Preliminary**
  - Single Building (“Most typical”)
  - Technology Specific / Per Square Foot Estimates
  - 30 - 60 days
  - 75 - 85%
- **Detailed**
  - Every Room (Full Access needed)
  - In depth power / run-time metering
  - Engineering drawings / modeling
  - 3 to 6 months
  - 95 - 100%

Energy Studies

Success Factors

- Customer Coordinator with Authority to request access to spaces
- Time with Knowledgeable Operational Personnel
- Utility Bills (Gas / Electric / Water / Sewer)
- Site and Floor Plans
- As-Built Drawings (Mechanical & Electrical)
- Capital Improvement Plans

Energy Studies

Success Factors

- Same Information to all Competitors
- Operational Usage Description by Building/Room
- Service and O&M Costs / Contract Scopes

Financing

Most Often Used Options

- Third-Party Commercial Lease
- Third-Party Municipal Lease
- Funded Capital
- Revolving Energy Funds

Financing

What is Financed?

- **Construction Period**
  - Length of Construction
  - Draw Schedule
  - Escrow Interest Earned
  - Payment Approvals
- **Cost Lease Based On (CLBO)**
  - Construction Cost + Construction Period Interest
- **Yearly Service not normally financed**

ESPC Components

Financing

How Long?

- State & City Projects up to 15 years
- Federal Projects up to 25 years

Language Needs

- Hawaii State Lease Rider
- Non-Appropriations Requirements

Misc.

- Tax Incentives
- Rebates
- Depreciation

Financing

Details

- Credit Ratings
- Payment Schedules
- Buyout Values

M & V

Definition

- **Measurement & Verification (M&V)**
  - **Methods and Procedures Used to Quantify Savings**
  - **Utilize accepted M&V "Protocols"**

Protocols

- **FEMP Guidelines Measurement & Verification**
  www.eere.energy.gov/femp/financing/espc/measguide.html
- **International Performance M&V Protocol**
  www.ipmvp.com
- **ASHRAE Guidelines**
  (www.ashrae.org)

M & V

Simple Idea

- **Savings = “Baseline” - “Post Installation”**

Factors

- **Operating Hours**
- **Equipment Efficiency**
- **Weather**
- **Special Events**
- **Construction / Renovations**
- **Change of Use**

ESPC Components

M & V

Myth

- **More is Better**

Reasons

- **Complexity**
- **Cost - First & On-Going**
- **Minimal Gains in Accuracy**
- **Administration**
- **Persistence of Reviews**
- **Understandability**

M & V

Common Phrase

“ Potential to Generate Savings”

What is means

Confirming that...

- **Baseline Conditions are Defined**
- **Proper Equipment / Systems Installed**
- **Equipment Performing to Specifications**
- **Potential to Generate Predicted Savings**

M & V

How — **Techniques of Determining Savings**

Actions — **Savings proven Using**

- **Engineering Calculations**
- **Metering and Monitoring**
- **Utility Bill Analysis**
- **Computer Simulations**

PERFORMANCE CONTRACTING

COUNTY OF HAWAII

- The County of Hawaii embarked on its Performance Contracting program in 1995.
- Prior to that date energy audits had been carried out for some larger County facilities but no retrofits had been carried out due mainly to budgetary constraints.
- Performance contracting opened up the possibility of generating project funding without using CIP funds.
- Another attraction was that the ESCO would carry out all aspects of project management including design, installation and maintenance and would also provide guaranteed savings.
- A consultant, Steve Harding, was retained to help in drafting and implementing the RFP.

PERFORMANCE CONTRACTING

COUNTY OF HAWAII

- The Hawaii County Building in Hilo was selected for a demonstration retrofit by performance contract.
- The project was financed through a tax exempt municipal lease - $460,000 at 5.95% interest.
- Lighting systems were upgraded and the two 30-year old CFC chillers were replaced with smaller, more efficient, units.
- Installation proceeded with minimal impact on the occupants and was completed in February 1997.
- Guaranteed annual savings of $60,000 were realized for the six post-retrofit years to date.

PERFORMANCE CONTRACTING

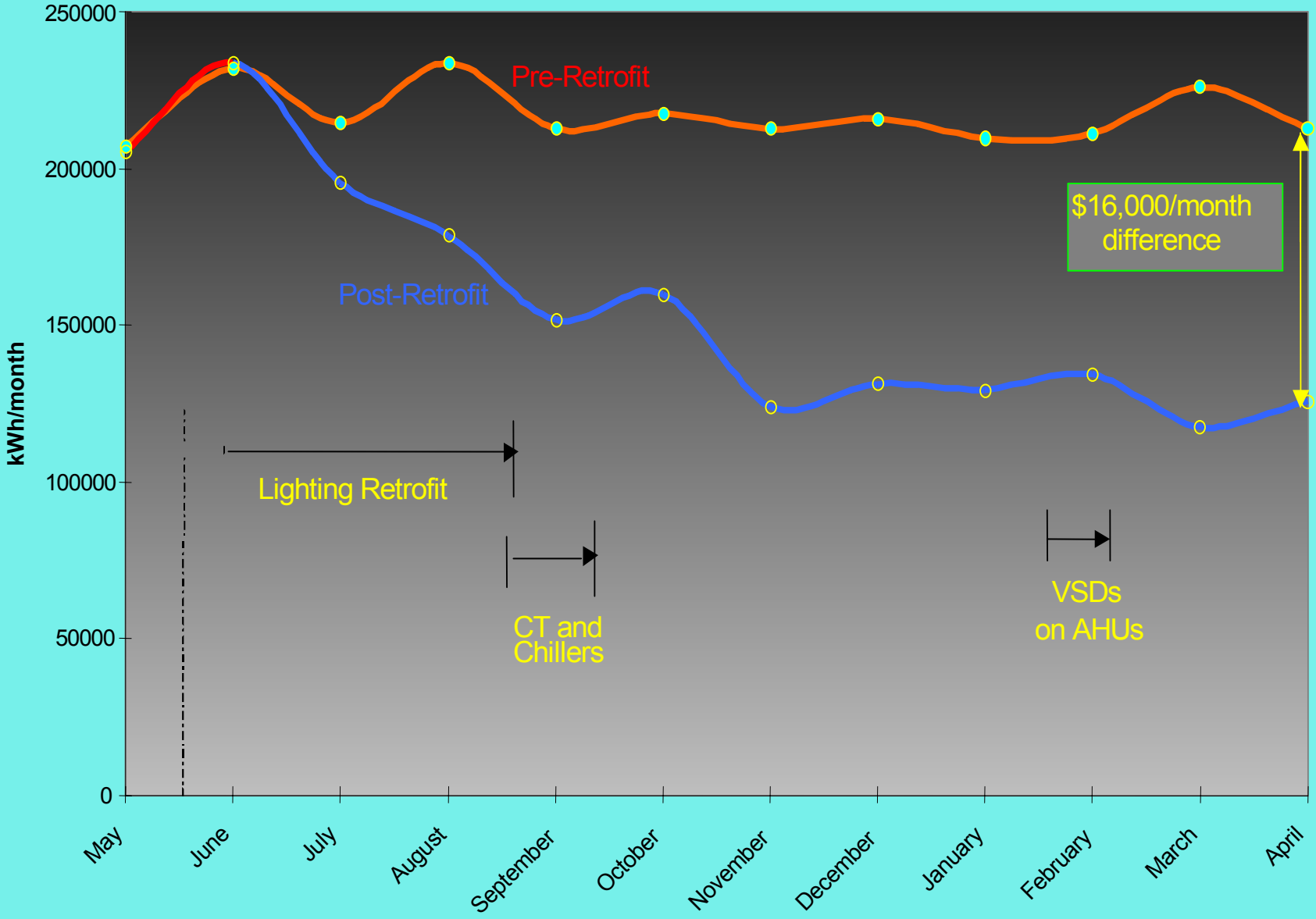
COUNTY OF HAWAII

- As a result of the successful retrofit of the Hawaii County Building Hilo, a master performance contract was developed to permit retrofitting of more facilities.
- The next project consisted of lighting upgrades to 27 Fire and Police stations located on a 300-mile circle around the Big Island.
- The project was financed via a 10-year municipal lease for $403,000 at 5.3% interest.
- Annual Savings of $51,000 were realized.

PERFORMANCE CONTRACTING

COUNTY OF HAWAII

- The next project was to retrofit the Hilo Public Safety Building and the Kona Police Station.
- This project was financed through a tax exempt municipal lease - $930,000 at 5.72% interest.
- The retrofit consisted mainly of upgrades to the lighting systems, chiller and cooling tower replacements, VSDs on the air handler units and a heat pump for water heating.
- Installation proceeded with no negative impacts on the occupants and was completed in October 2001.
- Guaranteed annual savings of $140,000 were achieved for the first post-retrofit year.


Electricity Savings at Hilo Public Safety Building
March 01 to April 02
250000
200000
150000
100000
50000
0
kWh/month
Pre-Retrofit
Post-Retrofit
$16,000/month difference
Lighting Retrofit
CT and Chillers
VSDs on AHUs
May
June
July
August
September
October
November
December
January
February
March
April

PERFORMANCE CONTRACTING

COUNTY OF HAWAII

The overall results of the performance contracting projects carried out to date are:

- **Capital Cost: $2,300,000**
- **Annual Energy Cost Savings: $ 250,000**
- **Annual Lease Payments: $ 235,000**

PERFORMANCE CONTRACTING

COUNTY OF HAWAII

BENEFITS

- Provides a source of funding - **THE JOB GETS DONE!**
- Guarantees project savings
- Facilitates all aspects of project implementation in a responsible design/build/commission scenario
- No change orders
- Includes post-installation maintenance
- Reduces in-house maintenance work load
- Proper disposal of hazardous wastes
- Generates utility DSM rebates

PERFORMANCE CONTRACTING

COUNTY OF HAWAII

LESSONS LEARNED

- Need a ‘champion’ to coordinate and drive timely implementation
- Many departments involved - Owner, Administration, Legal, Procurement, Accounting, Public Works
- Involves contract documentation that is different from normal spec/bid process
- Demarcation of maintenance responsibilities
- Correct basis for calculating savings
- Ensure Contractor responsible for interest during construction in the event of late project completion
- Contracts need to be monitored over a long time span
- Better suited to more complex retrofits than to lighting retrofits